

Nebraska ACS NewsLetter

<http://membership.acs.org/N/Nebraska/index.html>

Late Fall 2002

Monday, November 18th, 5:30 pm

Dinner and Presentation

Lincoln Valentinos (N. 35th and Holdredge)

“From the Loch Ness Monster to Killer Lake in Cameroon: Mysteries in Science”

by Ronald DeLorenzo

January, TBA

Annual Awards dinner

Section News

Nominations for all offices are now being accepted. Send your nominations to darveausa@unkmail.unk.edu. In particular nominations are being sought for a Board member and an Alternate Councilor.

NEBACS-L The Nebraska Section has an email ListServ! It was conceived primarily for timely dissemination of Section news, but feel free to utilize the list-serv for general queries on chemistry related issues. Rules of use will be forthcoming if the list-serv is abused. All subscriptions are kept confidential. Enjoy!

You can sign-up at (all one line):
<http://helios.nebrwesleyan.edu:8080/mailman/listinfo/nebacs-l>

The “Cooking Chemist” Kishore Bagga (NCW Chair) reported his presentation

"Chemistry and a taste of India" went extremely well in Hastings (at Central Community College). More than eighty people attended the event, which was held on the 26th February, 2002. In addition a report on the event was published by the Hastings Tribune. It hit first page! Furthermore a page in the food section was also devoted to the event. In addition to the public, a number of ACS members were in attendance.

Kishore is now taking his presentation (and cooking classes) on the road. Indeed some of you may have seen him at the Nebraska Academy of Sciences this past spring. If you would like to schedule a presentation in your area contact Kishore via email at kbagga@cccneb.edu. Be sure to address all correspondence to “The Cooking Chemist!”

West Nile Virus Could It Enter the Food Chain?

A contribution from member Weldon Vlasak
(adaptent@alltel.net)

At the September ACS Section meeting, Georgianna gave a presentation on food processing methods. One issue had to do with food safety, reducing the presence of dangerous and unwanted materials such as allergenic components, bugs, etc. I had asked if there was any effort being conducted to see if the West Nile Virus (WNV) might be entering the food chain (actually it already has, since mosquitoes and birds are part of the food chain. I should have said food supply) and creating a danger to the populus. An expert in the audience replied that the evidence indicates that WNV can only be transmitted through blood transfer, and that mosquitoes are the carriers.

What prompted me to ask this question was the large incidence of the death of birds of prey, such as owls and raptors, due to WNV. Unusual events often yield important clues. Owls, in particular, are not present in large quantities in the wild, and yet the recent numbers of dead owls in Southeast Nebraska appeared to me to be out of proportion. The answer to this was that certain animals are more susceptible to this disease than others, and that owls and raptors most likely fall in this category.

A few days later, an article in the latest issue of *Science* magazine (20 September 2002, p.1988) described earlier laboratory experiments conducted by scientists at USGS and the CDC that had found evidence that birds do not have to be bitten by mosquitoes in order to contract WNV. This result led to the speculation that birds might have acquired the virus from each other by eating tainted prey.

A search of the Web yielded further information. A USGS new release on the subject, dated 25 October 2000 titled "USGS Researchers: West Nile Virus Moves Bird-to Bird in Lab" provided more details about bird-to-bird transmission of the disease. According to Dr. Robert McLean, director of the USGS, a highly controlled experiment was conducted. Infected birds were placed in a biocontainment aviary along with healthy birds. The infected birds died 5-8 days later, while the healthy birds died 5-8 days after the first infected bird died. In an earlier similar experiment, the birds were placed in separate cages placed side-by-side, but no evidence of direct transmission of the virus to the healthy birds was experienced.

Although McLean stated that the threat of humans contracting the virus directly from birds is slim, he also recommended avoiding the handling of dead bird or using a plastic bag turned inside out to protect your hand. He emphasized that how the virus is transmitted as it moves from bird to bird is chief among the questions yet to be answered.

It was found that crows (also scavengers) have suffered nearly 100% mortality in lab experiments, while gulls and pigeons are less susceptible to the disease. The virus produces encephalitis in humans, while the disease attacks the entire body of crows and often attacks the major organs.

The number of cases of infection in humans decreased from only 62 in 1999 to 21 in 2000 and then increased to 66 in 2001. Then it suddenly exploded to 1460 so far this year. The decrease in 2000 is attributed to preventative measures that were taken. The rapid spread of the disease is believed to be a consequence of the very hot summer this year, which increases the production of organic pollutants favorable to the breeding of mosquitoes and speeds up their life cycles. Tests made by a Harvard entomologist failed to confirm this theory, while a French team claims to have isolated a gene in mice strains that is susceptible to the virus.

The September 18 issue of the *Christian Science Monitor*, contained an interesting and rather startling article. Senator Patrick Leahy, who has knowledge of intelligence matters, urged the government to explore the possibility of a terrorist link to the outbreak of WNV as being used as a biological weapon.

Assistant Secretary of State for Intelligence and Research, Carl Ford Jr. has testified to the US Senate that Cuba is involved in biological warfare research and development effort, and that they have provided biotechnology to rogue states.

The solution to the famous “host/parasite” problem is used to analyze population variations in cases such as this. This problem is analyzed by modeling the nonlinear equations and then solving them by computer analysis. The resulting plots of parasite vs host form limit cycles around a single stable point. When the population decrease is proportionately negligible, the problem reduces to a simple differential equation, as is the case thus far, and the increase in the number of deaths is the sum of a linear and an exponential term. Assuming that the number of deaths is a fixed percentage of the number of cases, the incidence of WNV can be predicted. For linear expansion, the number of cases for this year would have been expected to be about 300. However, the number of cases has already exceeded 1400. For exponential expansion, the number of cases of WNV could reach tens of thousands as early as the end of next year. Once the disease has spread throughout the country, the rate of infection should level off.

Although the preponderance of the evidence is in favor of blood transmission, a number of questions remain to be answered. Is it somehow possible that this virus can be transmitted to humans via the food chain? The gene believed responsible for susceptibility to the WNV was recently found in the breast milk of a Michigan woman who had contracted the disease. Could the disease be contracted

by eating infected animals such as chickens (who do not succumb to the disease but are carriers)? I could not find more recent reports about the crow-to-crow transmission of WNV. The mystery of McLean’s crow experiment needs to be resolved, since it appears that there may be other means of transmission of the virus other than through the blood. There are evidently many things about WNV that we do not yet know, and current theories have not yet been fully substantiated. However, the parameters in the equation can change with variables such as the hot weather theory or biological warfare.

The prevailing evidence indicates that the virus is spread primarily through the blood. However, it has already entered the food chain, and the Canadian Food Inspection Agency is tracking the spread of WNV in Canada. All of the questions about the transmission (vectors) of the disease have not yet been answered, which is key to the problem of food safety. Fortunately, investigations of this subject are under way.

Resources:

www.usgs.gov/public/public_affairs/press_releases

www.asci.uvm.edu/equine/West_Nile_Virus.htm

www.nwhc.usgs.gov/whats_new/wha/wha0002b.html

www.birdsnways.com/wisdom/ww51ev.htm

www.csmonitor.com/2002/0918/p11s01-cojh.html

www.lm.nih.gov/medicineplus/westnilevirus.html

www.advocate.com

www.haciencapos.com/betan.html

Have you Read these?

-from the Editors bookshelf

Americas Forgotten Pandemic: The Influenza Virus of 1918 (Alfred W. Crosby)

Arrowsmith (Sinclair Lewis)

-a story of experimental medical research (loosely based on figures associated with the Rockefeller Institute).

Fresh Water (E. C. Pielou)

Oceans End: Travels Through Endangered Seas (Colin Woodward)

If you have a favorite science related title of your own, send it to the secretary for inclusion in subsequent editions of the newsletter. An original review would be nice too!

Water, Friend or Foe ?

New Orleans has made national news recently because of two significant water related problems: severe hurricanes and algae blooms depleting dissolved oxygen in parts of the Gulf of Mexico.

Oxygen depletion is tied to fertilizer runoff from agriculture (for those who didn't know the Mississippi drains essentially 1/3 of the United States) resulting in significant algae blooms and leading to severe oxygen depletion in the Gulf.

In a related water problem the possibility of significant damage to New Orleans from hurricanes has apparently worsened in recent years due to destruction of local wetlands (due in part to the "taming" of the Mississippi). The belief is that the wetlands serve(d) as a hurricane buffer zone, quickly draining the energy of even a severe hurricane before it could reach the populated

areas. With more open waters closer to New Orleans, it is now believed that even a small scale squall could result in significant death and destruction.

For more on the many faces of water, check out "Ogallala, Water for a Dry Land (Opie) and Lifes Matrix:A Biography of Water (Philip Ball) as well as those water related books noted in the previous section.

Do you know of any members not receiving our mailings? Drop a line to the secretary at nfackler@nebrweslevan.edu or voice mail: 402.465.7500 x2261.